

## **Proposed 2020 Mars Rover Science Goals**

JIM BELL

Planetary Scientist :

It's a whole planet out there with a complicated story that's stored in the rocks and our job is to figure out that story and what that story of that planet tells us about the planet that we live on.

JACK MUSTARD

Science Definition Team Chair

The recommendations of the Science Definition Team to NASA are to fly a rover of similar capability to the Curiosity rover that's still on Mars that would land in the same way and have the same size.

And we are recommending that they equip that rover with instrumentation that allows it to explore the surface of Mars at one site which will have relevant importance to understanding past habitability did it have conditions necessary to sustain life and to look for signatures or rocks that may hold signatures of biological significance.

LINDY ELKINS-TANTON

Planetary Scientist

So where Curiosity, which was a phenomenal mission where it takes rocks and grinds them up into powder and looks at their bulk constituents—

What this mission would need to do is be able to look at a microscopic level and detailed messages that they would be sending us about the past life that could've lived there.

ABIGAIL ALLWOOD

Astrobiologist

The sorts of evidence we're looking for the signatures of past life, would be signatures of microbial life. Not realistically looking for dinosaur bones and that kind of thing.

If life ever existed on Mars, we expect it to have been microbial microorganisms.

JACK MUSTARD

Science Definition Team Chair

This that I'm holding up here is a classic biosignature from the Earth. It's a fossil. We're not actually expecting to see a fossil of shells or other components, but what we want to be able to see with this instrumentation, are the fine scale layering that one might see in a rock, in which we can see dark and light tone layers and those dark and light tone layers are telling a story.

JIM BELL

Planetary Scientist

We wanted to do something that would make technical progress and that thing was going and coring rock samples, putting them into a little container, a cache, and storing them for bringing back later.

LINDY ELKINS-TANTON

Planetary Scientist

Because no matter how well instrumented a rover is we can't look with the kind of detailed understanding that we would have in laboratories back here on Earth.

JIM BELL

Planetary Scientist

We can do so much more in laboratories on Earth with equipment that exists now and who knows what's getting invented decades ahead that can still analyze those rocks.

JACK MUSTARD

Science Definition Team Chair

The human flight component would like to see an experiment where resources on the surface of Mars, from the rocks or the atmosphere could be used to generate fuel or other parts that would enable future exploration in cutting the ties so to speak to Earth. So you wouldn't necessarily have to bring everything with you. You could actually manufacture it on the planet. And that's a really exciting additional component that we've been exploring and analyzing in this work.